triwaco

groundwater modelling software

8 Pre-Processing with the graphical editor: DIGEDIT

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Chapter 8: Pre-processing with the graphical editor: DigEdit

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8.1 Introduction

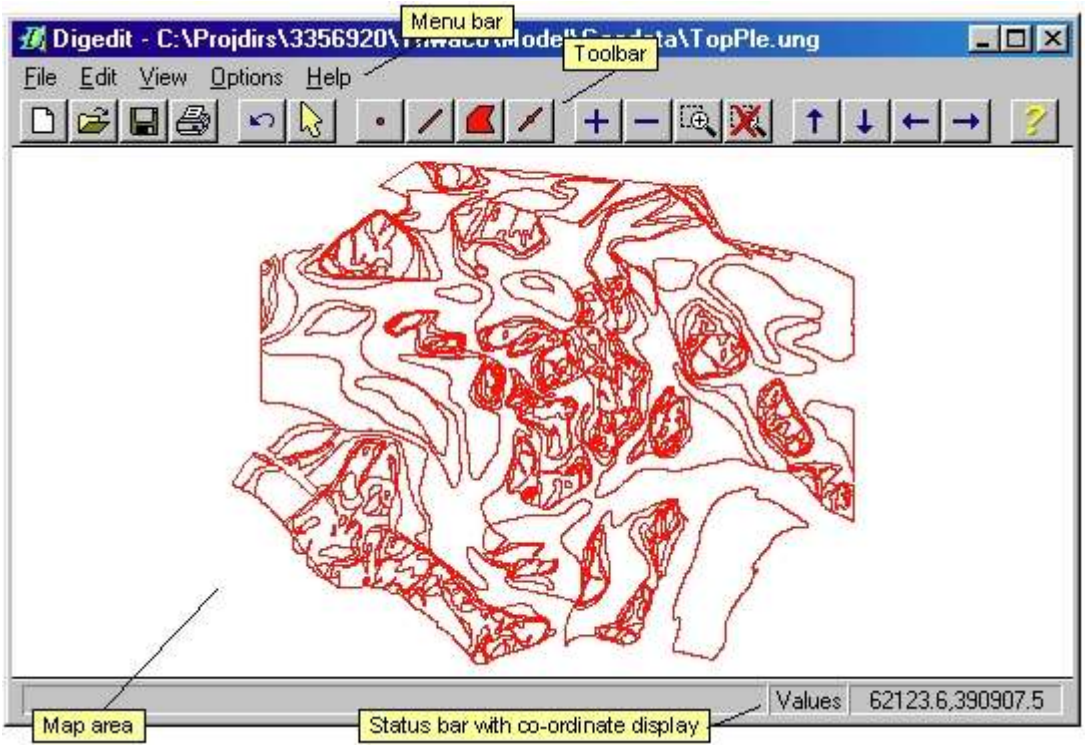
DigEdit is a Windows-based graphical editing tool, which can be used to create and edit maps (coordinates as well as associated parameters). **DigEdit** can handle input from keyboard, mouse and digitiser. Graphical editing, however, is only possible using either a mouse or a digitiser. Menu commands can be issued using a keyboard and/or a mouse.

The program facilitates the process of modelling, especially the generation of the grid and parameter input. **DigEdit** can be called from within the **TriShell**, but can also be used stand-alone.

DigEdit stores the digitised or edited information in ASCII text files that can be read by the internal and external **Triwaco** programs and by GIS based programs like ArcView, ArcGIS and ArcInfo. Editing of maps is usually realised using a mouse, changes being displayed instantaneously on screen, the results may be printed.

8.2 Concepts and terms

DigEdit can be started as a stand-alone program by selecting the **DigEdit**-icon from the **Triwaco** programs folder. However it is usually started from **Triwaco** data sets by highlighting a parameter and subsequently choosing 'Parameter' 'View' 'Map' from the pull-down menu, or right-click mouse choosing 'Edit Map file' (Initial data set) or 'View Map file' (other data set) or just by double clicking the highlighted parameter. **DigEdit** will start and open the map, which corresponds with the parameter selected. If no map exists the program displays a warning. The map will be displayed in a graphical screen, an example is shown below.



At the top of the screen a menubar and a toolbar present the user the possibility to issue many commands. At the bottom of the graphical screen a status bar shows the coordinates of the mouse pointer in the graphical screen in map units. Moreover the status bar shows the actual mode for presenting labels and presents some help for the options in the menu bar and the toolbar.

A map is defined as a collection of dataobjects stored in a number of readable (ASCII) files. These files contain information on the geographical ***location*** of the data objects; the ***properties*** of the data objects and the ***name*** associated with the data objects.

The geographical ***location*** of the data objects defining a parameter is given by an ***ID*** and one or more sets of ***coordinates***, this information is stored in a file with the parameter's name and the extension ***'ung'***. An ***ID*** and a ***parameter value***, stored in a file with the parameter's name and the extension ***'par'***, define the ***properties***

of the parameter. Finally, the ***names*** associated with the data objects are given by an ***ID*** and a ***text string*** and stored similarly in a file with extension ***'nam'***. An example of a file with point data is given below. The files are always space delimited. Tab delimited will result in errors by the various programs.

POINT.UNG			POINT.PAR		POINT.NAM	
ID	X-co-ordinate	Y-co-ordinate	ID	Value	ID	Name
1	148256.92	408657.1	1	-300	1	Farmer
2	149131.7	409651.85	2	-200	2	Abstraction well
3	147557.1	410246.7	3	500	3	Injection well
END						

DigEdit recognizes the following data objects:

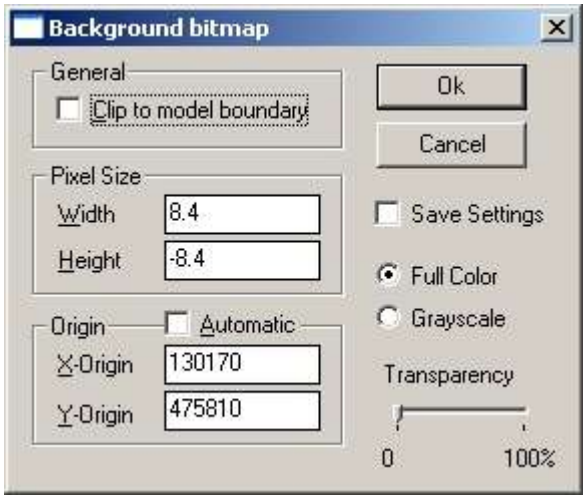
data object	Definition
point	Each point is defined by a unique ID and a single set of coordinates. A point may be assigned a value and a name. The coordinates, value and name are stored in separate files: (*point.ung*, *point.par* and *point.nam*)
line	A line is defined by a unique ID and a series of two or more vertices. The coordinates of all vertices are different. A line may be assigned a value and a name. The coordinates, value and name are stored in separate files: (*line.ung*, *line.par* and *line.nam*)
polygon	A polygon is defined by a unique ID and a series of vertices; the number of vertices generally will be four or more. The coordinates of the first and last vertex should be identical. A polygon may be assigned a value and a name. The coordinates, value and name are stored in separate files: (*polygon.ung*, *polygon.par* and *polygon.nam*)
linked point	A linked point is defined by a single set of coordinates. The point is linked to either a line or a polygon with a specific ID; the point's ID should be equal to the object's ID it is linked to. A linked point should be assigned a value. Both the coordinates and the value are stored in the same file: *linked.ung*
vertex	A vertex is defined by a single set of coordinates. No vertex can exist by itself, but always is part of a line or a polygon. A vertex never is assigned a value or a name. The vertex's coordinates are stored in the *ung*-file of the line or polygon it belongs to.

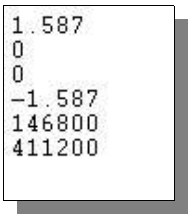
Depending on the way **DigEdit** is started some of the types of data objects may be enabled or disabled at start-up. If **DigEdit** is started as a stand-alone program all types of data objects are available. However, if **DigEdit** is called from the ***TriShell***, some of the data objects may be disabled. The toolbar-icons of disabled data objects will be displayed in gray. This may be the case opening the map of, for example, the grid's boundary. In that case it is not possible to add a line or a point to the map, because the grid's boundary consists of a polygon only. Selecting a point (or vertex), however, still will be possible.

An existing map can be used as ***background map***; e.g. the data objects are displayed on the screen while one is editing another map. The background map, however, cannot be edited. Apart from **DigEdit**'s ung-files some other file types, containing graphical information, may be used as background map. In order to display the background map in real world coordinates, pixel oriented background maps should be accompanied by an associated so-called world-file. At present **DigEdit** supports the following ***background file types***:

AutoCAD DXF files	*.dxf
ARC/INFO ungenerate files	*.ung
ArcView Shapefiles	*.shp
Dawaco maps	*.map; *.top
Windows Bitmap files	*.bmp
TIFF files	*.tif
GIF files	*.gif
PCX files	*.pcx
JPEG files	*.jpg

While opening a bitmap as a background, **DigEdit** will display a dialog box, which can be used to scale the bitmap to the edited map. The size of the pixels can be changed as well as the origin of the bitmap (the upper left corner). Changing the width or the height independently from one another may result in a distorted bitmap. By pressing the Save button, **DigEdit** will save a world-file (bitmap.tfw) with the actual values for pixel size, origin and rotation shown in the dialog box. The next time **DigEdit** opens the bitmap (for example bitmap.bmp) the values stored in the associated world file will be given as default values. If no world file is present the width and height of the pixels are computed from the width and height of the area displayed in the bitmap (in user units) and the number of pixels in horizontal and vertical direction. The world-file may also be edited or created using a text-editor. It is important that the worldfile (*.tfw) has the same name as the bitmap file. Below an example of a dialog box and next to it the same data shown in the tfw-file.

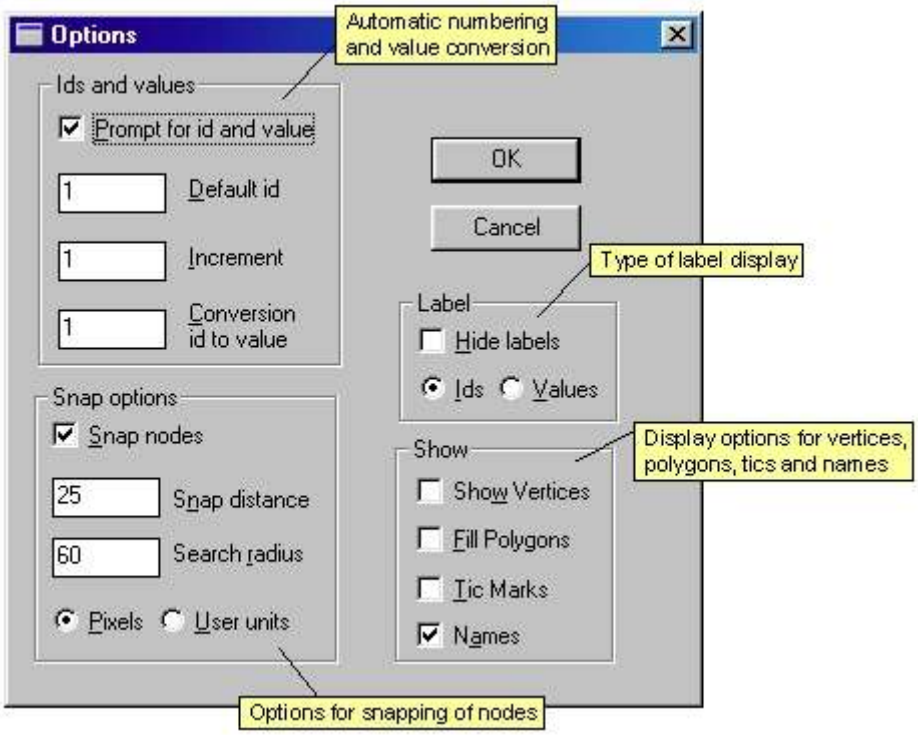




It is possible to open several background maps at the same time to facilitate editing of the current map.

8.3 General settings

The general settings, which are stored in the options section of the Setting File ***DigEdit.ini,*** can be accessed via the 'Options' | "Setup' command. This command will open the options window.



The options window contains four specific areas:

1. the Ids and Values area
2. the Snap Options area
3. the Label area
4. the Show area

8.3.1 Ids and values

The **'Ids and Values'** area allows the user to define default values for the ID, the increment and for the conversion of new data object's ID to a value. Moreover, the user can specify whether or not the program displays the pop-up dialog box for defining ID, value and name of the data objects every time a data object is added to the map.

Default ID	Set the default value for the ID of new data objects
Increment	Set the increment for the ID of new data objects. Every time a data object is added its ID will be increased with this number.
Conversion ID to value	Multiplication factor to automatically compute a value for every data object added.

8.3.2 Snap Options

The **'Snap options'** area allows the user to define whether the snap option will be enabled or not. Moreover, the user specifies the values for the snap distance and the search radius. Finally, the user indicates whether the measurement units for snapping are pixels (e.g. depending on the degree of zooming) or user units (e.g. 'real world' measures).

Snap Distance	Set the snap distance. Whenever a new point (or vertex) is closer to an existing point than the snap distance the new point will be moved to the exact location of the existing point. The snap distance has no effect on existing data objects, unless they are moved or snapped to a new position.
Search radius	Set the search radius. In selecting an existing data object the search radius defines the area in which the program searches for the desired data object. The larger the search radius the less accurate one has to point (with the mouse) to a data object in order to select it.

8.3.3 Label

The **'Label'** area allows the user to define whether or not labels will be displayed for each of the data objects of the current map. The user also indicates whether the label displayed defines the object's ID or the value assigned to the data object.

Hide Labels		Do not display the data object's labels if the check box in front is activated (☑).
IDs	**Values**	Choose whether to display the Ids of the data objects or their values.

8.3.4 Show

The **'Show'** area allows the user to define whether certain items will be displayed or not. The user also indicates the way data objects appear.

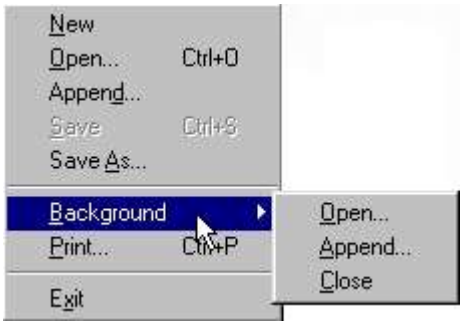
Show Vertices	Display all vertices belonging to a line or polygon if the check box in front is activated (☑).
Fill Polygons	Fills the polygon (with a solid color fill) if the check box in front is activated (☑). Otherwise displays the outline only.
Tic Marks	Display the (four) tic marks if the check box in front is activated (☑).
Names	Display the names of data objects if the check box in front is activated (☑).

8.4 Menu bar

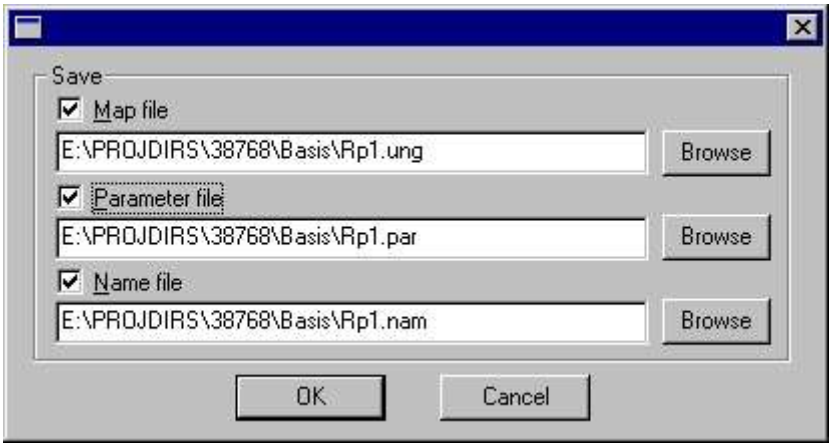
The menu bar displays the following five commands: File, Edit, View, Options and Help (See graphical screen). Selecting one of these commands activates a pull-down menu with a number of sub-commands. Some of the sub-commands may be activated by a shortcut-key (generally the **Ctrl**-key and another character).

File

Selecting 'File' from the menu bar activates the File Commands pull-down menu. The pull-down menu offers the following sub-commands to choose from:



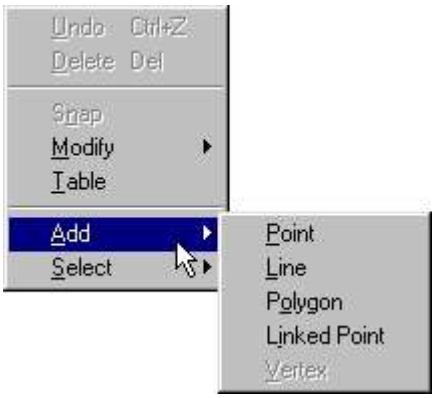
New	Create a new map. Issuing this command causes the program to close the current map and start with a blank screen.
Open	Open an existing map. Issuing this command causes the program to prompt for a filename (usually with extension **ung**). The file selected will be opened and the program checks whether the corresponding parameter file (**par** file) is present. ***Next to ung files, DigEdit can open ArcView shapefiles (*.shp).*** Shortcut-key for this command: **Ctrl+O**.
Append	Append an existing map to the current map. All properties of the data in the new map (coordinates as well as ID's and values) will be appended to the current map. ***Next to ung files, DigEdit can append ArcView shapefiles (*.shp).*** After appending data one should be very careful with saving the map. Use the correct name for the *.ung file and the *.par file and be sure to activate the check box in front of the parameter file (☑).
	NOTE that appending data objects with the same ID's as data objects in the actual map will change their values to the values of the data objects in the map that is being appended
Save	Save the current map, using the name in the title bar. If no name is present the 'Save As' command will be executed. Issuing this command will result in the popup of a dialog box by which the user is prompted for saving the map file, the parameter file and name file. The names for these files should only differ by their extension (respectively ung, par and nam). It is recommended to activate at least the check boxes in front of the map file and the parameter file (☑). Shortcut-key for this command: **Ctrl+S**.



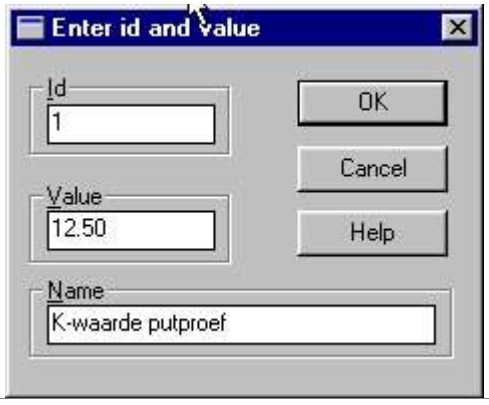
Save As		Save the current map as a **DigEdit** map file or as an ArcView shape file (*.shp). The program will prompt the user to give a name. While saving the current map as a **DigEdit** map, it is strongly recommended to use the default extensions for the associated files: **'ung'** for the map file, **'par'** for the parameter file and **'nam'** for the file with data object names. ***Note** that saving a map with overlapping polygons as an ArcView shape may result in an erroneous shapefile. **DigEdit** and Triplot may properly read these files, while within ArcView unexpected polygons may be present. This problem can be avoided by directly importing *.ung files in ArcView using a specific ArcView extension made by Royal Haskoning.*
Background		
	Open	Open an existing map to be displayed as background for the current map. Standard **DigEdit** files may be used as well as several other file types as a background.
	Append	Append a background map to the background. The current background map(s) and the map to be appended will be displayed. Standard **DigEdit** files may be used as well as several other file types as a background.
	Close	Close all background maps and display the current map with a blank background.
Print		Send the actual view of the map (the part that is displayed in the window) to the printer. All visible data objects in the actual view, including any background map will be printed. The printer settings can be adjusted. The user may choose to automatically scale the actual view to the size of the paper or to enter a fixed scale. Shortcut-key for this command: **Ctrl+P**.
Exit		Close the current map and quit the program. Issuing this command, while the current map is not saved to disk will cause the program to display a warning and to ask whether or not to save the current map.
		NOTE that canceling the Exit command is not possible.

Edit

Selecting 'Edit' from the menu bar activates the Edit Commands pull-down menu. Several sub-commands are only available after editing actually has started. The inactivated choices are displayed in gray. The pull-down menu offers the following sub-commands to choose from:



Undo		Cancel the last action. The last action will be added to the command: e.g. the command will be 'Undo Add Point' when the last action was adding a point. Issuing this command causes the program to erase the last action: adding, moving or editing a data object. Every time the 'Undo' command is being issued the program displays the preceding action in the pull-down menu. Shortcut-key for this command: **Ctrl+U**.
Delete		Remove the selected data object(s) from the current map. All information associated with the data object(s) will be lost. Shortcut-key for this command: **Del**.
Snap		Move one or many selected points, vertices or linked points to the location of a not selected point, vertex or linked point in the vicinity. If the selected point(s) are very close to any not selected point, i.e. within the snap distance, the points will be moved to the exact location of the existing not selected point.
Modify		Modify the properties of the selected data object(s). Using the command 'Modify' it is possible to change the ID's, values and names for all selected objects at once. Modifying a selected data object is also possible by selecting an object with the right-hand mouse button. However, in this case it is not possible to modify more than one data object at the same time (unless they have the same ID's).
	IDs and Values	Change both ID's and values of the selected data object(s). ***Note** that changing ID's will cause all of the selected objects having the same ID and hence the same value and name as well.*
	Values only	Change the value of the selected data object(s). It is recommended to use this option rather than the previous one. In this case values can be easily restored, without affecting other data objects.
	Names only	Change the name of the selected data object(s).
Table		Edit the parameter file (**'par'** file) belonging to the current map. It is only possible to edit the values of the data objects (2nd column). The ID's (1st column) cannot be edited). ***Note** that it seems to be possible to edit the first column and even to delete entire rows, e.g. data objects. Closing and reopening the table will restore the changes for the first column.* ***Note** that this option does not work for linked points, because the parameter value of a linked point is not stored in the parameter file but in the map file!*
Add		Add data objects to the current map.
	Point	Add a point to the current map. The point is added pressing the left-hand mouse button. Every time a point is added the program displays a pop-up dialog box and prompts to enter an ID, a value and name. The pop-up dialog box is not displayed if the option 'prompt for id and values' in the general settings is switched off.



	Line	Add a line to the current map. Every time the left-hand mouse button is pressed a vertex (point) is added to the line. Pressing the right-hand mouse button adds the last vertex (point) to the line and causes the program to display the pop-up dialog box for entering the ID, value and name associated to the line. The pop-up dialog box is not displayed if the option 'prompt for id and values' in the general settings is switched off.
	Polygon	Add a polygon to the current map. Every time the left-hand mouse button is pressed a vertex (point) is added to the polygon. Pressing the right-hand mouse button adds the last vertex (point) and closes the polygon. The program displays the pop-up dialog box for entering the ID, value and name associated to the polygon. The pop-up dialog box is not displayed the option 'prompt for id and values' in the general settings is switched off.
	Linked point	Add a linked point to the current map. Every time the left-hand mouse button is pressed a linked point is added. The program displays the pop-up dialog box for entering the Link-ID, the ID and the value and name associated to the linked point. The Link ID entered should be the ID of the line or polygon the linked point refers to. Selecting this line or polygon prior to assigning the linked point will cause the program to automatically enter the ID of the selected line or polygon in the dialog box. The ID of the linked point itself is created by the program and can only be used in order to select the point by its ID. It is strongly recommended not to switch off the option 'prompt for id and values' in the general settings while adding linked points. **No shortcut-key for this command**
	Vertex	Add a vertex to an existing line or polygon in the current map. The vertex is added pressing the left-hand mouse button. In order to add a vertex the line or polygon has to be selected first. No pop-up dialog box will be displayed. Shortcut-key for this command: **Ins**.
Select		Select data objects from the current map. To select single items one should enter 'Select mode' by choosing the select-icon and one of the data object types (point, line, polygon, linked point) from the toolbar. To select multiple items one at a time it is possible to use the left mouse-hand button together with the Control-button.
	Select Ids	Select data objects of a chosen type of which the ID's are within a user-specified range.
	Lasso	Using this option will select all data objects of a chosen type that are situated (partly) within a polygon (lasso). The polygon should be entered as a normal polygon, i.e. stop entering the lasso by adding a point with the right-hand mouse button. The type of data object must be selected in advance by selecting the appropriate button in the toolbar
	Select All	Select all data objects of the current map.
	Unselect All	Undo selection of all (selected) items.

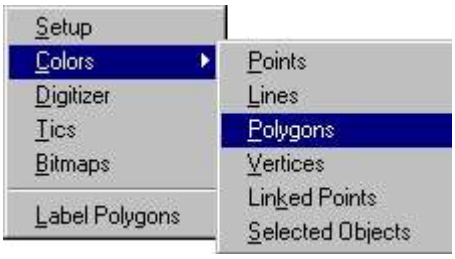
View

Selecting 'View' from the menu bar activates the View Commands pull-down menu. It comprises commands that enable adjustment of the size of the current map on the screen (zooming). These View commands can be issued via this pull down menu, via the Toolbar or with specific Shortcut-keys. The pull-down menu offers the following sub-commands to choose from:

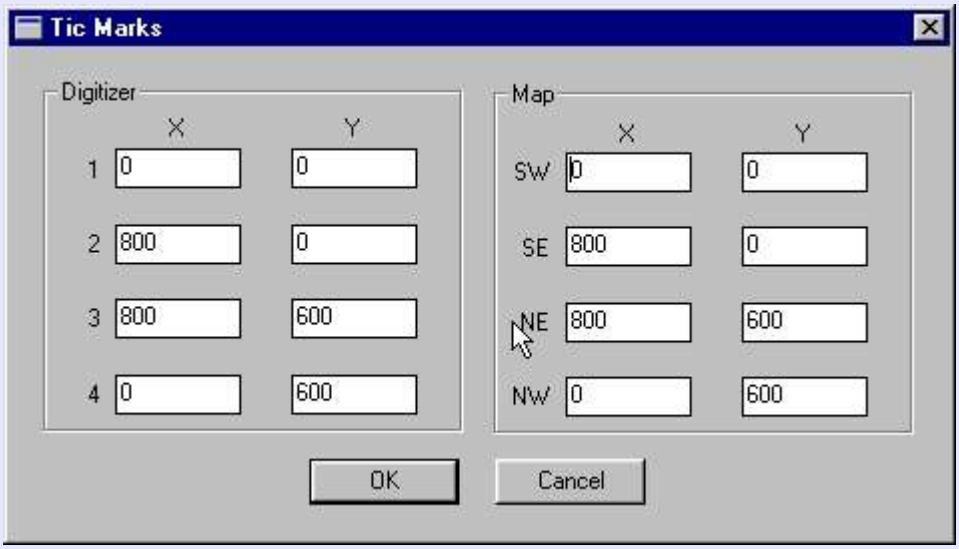
Reset	Fit the map in the current window, thus giving an overview of all data objects belonging to the actual map. Shortcut-key for this command: **Home**.
Zoom In	Enlarge the scale with a fixed amount. Shortcut-key for this command: **Gray +** (on the numerical keypad).
Zoom Out	Reduce the scale with a fixed amount. Shortcut-key for this command: **Gray -** (on the numerical keypad).
Zoom Box	Define the area to be displayed by drawing a box. The area is defined by keeping the left-hand mouse button pressed and moving the cursor from the left-hand top corner to the right-hand bottom of the box. Shortcut-key for this command: **Gray *** (on the numerical keypad).

Options

Selecting 'Options' from the menu bar activates the Options Commands pull-down menu. It comprises commands that define overall parameters for the **DigEdit** session. The pull-down menu offers the following sub-commands to choose from:



Setup	The user can set own preferences within **DigEdit**. These preferences are referred to as the general settings.
Colors	The colors used to display different types of data objects may be redefined here. The default colors used by **DigEdit** are:
	Points — **Light-green** Lines — **blue** Polygons — **Dark-green** Vertices of lines and/or polygons — **purple** Linked points — **blue** Selected data objects — **red**
digitiser	Define the digitizing equipment used and the settings for the communication between the computer and the digitizing equipment. One can only choose from a restricted number of digitisers.
Tics	Define the coordinates of the tic points. If the user does not define the tics through the window shown below, the tics are derived from the amount of pixels at the actual screen. Typical amounts of pixels for normal screens are nowadays 800 by 600 or 1024 by 800. If no digitiser is attached the left-hand side of the window is not available. The user can only change the coordinates of the map (at the right-hand side). This may be used to position the screen if no map is opened yet. Changing the map's orientation is not possible; as long as no digitiser is attached the maps within **DigEdit** are oriented to the north!



Bitmap	Define or change the way bitmaps are used as a background. If more than one bitmap is present as a background only the last one appended can be changed. The background bitmap dialog box will be displayed.
Label Polygons	Write the polygon labels at the center of each polygon.

Help

Selecting 'Help' from the menu bar activates the Help Commands pull-down menu. The pull-down menu offers the following sub-commands to choose from:

Help	Start this **DigEdit** Help file, using the installed HTML-browser.
About DigEdit	A pop-up window, showing the current version of **DigEdit**
About Royal Haskoning	A pop-up window, showing general information on Royal Haskoning

8.5 Toolbar

The toolbar offers the following possibilities that also may be addressed using commands from the menu bar (See graphical screen).

	Create a new map. Issuing this command causes the program to close the current map and start with a blank screen. Equivalent to 'File' 'New' from the menu bar.
	Open an existing map. Issuing this command causes the program to prompt for a filename (usually with extension **ung**). The program will open the selected file and looks for the corresponding parameter file (**par** file). Equivalent to 'File' 'Open' from the menu bar; Shortcut-key: **Ctrl+O**.
	Save the current map, using the name in the title bar. If no name is present the user is prompted for one. Equivalent to 'File' 'Save' from the menu bar; Shortcut-key: **Ctrl+S**.
	Send the actual view (the part that is displayed in the window) to the printing-device. The view includes all data objects visible with the actual state of zooming and any backgrounds selected. Equivalent to 'File' 'Print' from the menu bar; Shortcut-key: **Ctrl+P**.
	Cancel the last action. Equivalent to 'Edit' 'Undo' from the menu bar; Shortcut-key: **Ctrl+Z**.
	Select one or more data objects from the current map. THE SELECT-ICON IS USED IN ASSOCIATION WITH A DATA OBJECT ICON.
	Add a point to the current map. The point is added pressing the left-hand mouse button. Every time a point is added to the map the program displays a pop-up dialog box and prompts to enter an ID, a value and name. To select a point use this icon in association with
	Add a line to the current map. The line's vertices are added pressing the left-hand mouse button, except for the last vertex that is added pressing the right-hand mouse button. Every time a line is added to the map the program displays a pop-up dialog box and prompts to enter an ID, a value and name. To select a line use this icon in association
	Add a polygon to the current map. The polygon's vertices are added pressing the left-hand mouse button, except for the last vertex that is added pressing the right-hand mouse button. Every time a polygon is added to the map the program displays a pop-up dialog box and prompts to enter an ID, a value and name. To select a polygon use this icon in association with
	Add a linked point to the current map. The linked point is added pressing the left-hand mouse button. Every time a linked point is added the program displays a pop-up dialog box and prompts to enter an ID, a value and name. To select a linked point use this icon in association with
	Enlarge the scale with a fixed amount. Equivalent to 'View' 'Zoom In' from the menu bar; Shortcut-key: **Gray +**
	Reduce the scale with a fixed amount. Equivalent to 'View' 'Zoom Out' from the menu bar; Shortcut-key: **Gray -**
	Define the area to be displayed by drawing a box. The area is defined by keeping the left-hand mouse button pressed and moving the cursor from the left-hand top corner to the right-hand bottom of the box. Equivalent to 'View' 'Zoom Box' from the menu bar; Shortcut-key: **Gray ***
	Fit the map in the current window, thus giving an overview of all data objects belonging to the actual map. Equivalent to 'View' 'Reset' from the menu bar; Shortcut-key: **Home**.
	Pan up, down, left or right. Move the area of the map that is displayed in the current window in the direction of the arrow. Shortcut-keys: **Ctrl + Cursor-keys**.
	Show the contents of the **DigEdit** Help-file. All topics in the **DigEdit** Help-file can be accessed via the Contents. Equivalent to 'Help' 'Help' from the menu bar; Shortcut-key: **F1**.

8.6 How to …

8.6.1 How to create a new map

Select 'File' 'New' from the menu bar or the on the toolbar. **DigEdit** will show an empty screen and is ready to accept input. This is the default mode at start-up.

If the command is issued while a map is already opened, **DigEdit** will ask to discard all changes made after the last 'Save' command. Not discarding the changes will automatically cancel the command 'New'. If there are no changes to be saved, or if one chooses to discard the changes, **DigEdit** will show an empty screen and is ready to accept input.

8.6.2 How to open an existing map

Select 'File' 'Open' from the menu bar, the on the toolbar or use the shortcut **Ctrl-O**. **DigEdit** will display a dialog box and prompts the user to enter or select the name of an existing map; usually an **ung** file. After confirmation of the selected file the dialog box will be closed and **DigEdit** will read the data objects from file and show them on screen.

If the command is issued while a map is already opened, **DigEdit** will ask to discard all changes made after the last 'Save' command. Not discarding the changes will automatically cancel the command 'Open'. If there are no changes to be saved, or if one chooses to discard the changes, **DigEdit** will read the map file specified, show it on screen and is ready to accept input.

8.6.3 How to import a shape file (*.shp)

Select 'File' 'Open' from the menu bar, the on the toolbar or use the shortcut **Ctrl-O**. **DigEdit** will display a dialog box and prompts the user to enter or select the name of an existing map, in this case select ArcView shapefiles (*.shp) as file type. After confirmation of the selected file the import dialog box will appear. **DigEdit** will automatically detect the type of objects (polygons, lines or point objects). The user may specify the datafields, i.e. ID, Value and Name for the corresponding **Triwaco** file types. After importing the file can be saved in both shape and the native **Triwaco** file type.

8.6.4 How to export a shape file (*.shp)

Select 'File' 'Save As' from the menu bar. The program will prompt the user to give a name. **DigEdit** will display a dialog box and prompts the user select the type of object (polygon, point or line). The user has to specify the datafields, i.e. ID, Value and Name of the corresponding **Triwaco** file types.

***Note** that saving a map with overlapping polygons as an ArcView shape may result in an erroneous shapefile. **DigEdit** and Triplot may properly read these files, while within ArcView unexpected polygons may be present. This problem can be avoided by directly importing *.ung files in ArcView using a specific ArcView extension made by Royal Haskoning.*

8.6.5 How to merge multiple map files

The first map file is opened in the same manner as opening an existing map. All files to append are added by by selecting 'File' 'Append' from the menu bar. All properties of the data in the new map (coordinates as well as ID's and values) will be appended to the current map. ***Next to ung files, DigEdit can append ArcView shapefiles (*.shp).*** After appending data one should be very careful with saving the map. Use the correct name for the *.ung file and the *.par file and be sure to activate the check box in front of the parameter file (☑).

***Note** that appending data objects with the same ID's as data objects in the actual map will change their values to the values of the data objects in the map that is being appended.*

8.6.6 How to add a point

The program always starts in 'Add-mode'. The cursor within the graphical screen of **DigEdit** will be displayed as a cross hair. Choosing the on the toolbar will toggle between 'Add' and 'Select-mode' and the cursor will be displayed as an arrow. Select the type of data object to be a Point choosing the on the toolbar. This icon will turn green if this type is selected. Alternatively one may select 'Edit' 'Add' 'Point' from the menu bar.

Position the mouse or digitiser to the location where you want to add a point and press the left- or right-hand mouse button or the enter button of the digitiser. Dependending on the general settings, **DigEdit** will prompt for an ID, a value and a name.

***Note** that if you position the new point in the vicinity of an already existing point, vertex or linked point the new point may be slightly repositioned due to the process of snapping. Whether or not snapping will occur can be decided by adjusting the General settings (selecting 'Options' 'Setup' from the menu bar).*

8.6.7 How to add a line

The program always starts in 'Add-mode'. The cursor within the graphical screen of **DigEdit** will be displayed as a cross hair. Choosing the on the toolbar will toggle between 'Add' and 'Select-mode' and the cursor will be displayed s an arrow. Select the type of data object to be a Line choosing the on the toolbar. This icon will turn green if this type is selected. Alternatively one may select 'Edit' 'Add' 'Line' from the menu bar.

Position the mouse or digitiser to the location where you want to add the first vertex of the line and press the left-hand mouse button or the first button of the digitiser. Subsequent vertices can be added using the left-hand mouse button or the first button of the digitiser. To complete the line, position the mouse or digitiser to the location of the last vertex and press the right-hand mouse button or the second button of the digitiser. Dependent on the general settings, **DigEdit** will prompt for an ID, a value and a name.

***Note** that if you position a new vertex in the vicinity of an already existing point, vertex or linked point the new vertex may be slightly repositioned due to the process of snapping. Whether or not snapping will occur can be decided by adjusting the General settings (selecting 'Options' 'Setup' from the menu bar).*

8.6.8 How to add a polygon

The program always starts in 'Add-mode'. The cursor within the graphical screen of **DigEdit** will be displayed as a cross hair. Choosing the on the toolbar will toggle between 'Add' and 'Select-mode' and the cursor will be displayed. Select the type of data object to be a Polygon choosing the on the toolbar. This icon will turn green if this type is selected. Alternatively one may select 'Edit' 'Add' 'Polygon' from the menu bar.

Position the mouse or digitiser to the location where you want to add the first vertex of the polygon and press the left-hand mouse button or the first button of the digitiser. Subsequent vertices can be added using the left-hand mouse button or the first button of the digitiser. To complete the polygon, position the mouse or digitiser to the location of the last vertex and press the right-hand mouse button or the second button of the digitiser. **DigEdit** will automatically draw a line between this last vertex and the first vertex, thus automatically closing the polygon. Depending on the general settings, **DigEdit** will prompt for an ID, a value and a name.

***Note** that if you position a new vertex in the vicinity of an already existing point, vertex or linked point the new vertex may be slightly repositioned due to the process of snapping. Whether or not snapping will occur can be decided by adjusting the General settings (selecting 'Options' 'Setup' from the menu bar).*

8.6.9 How to add a linked point

The program always starts in 'Add-mode'. The cursor within the graphical screen of **DigEdit** will be displayed as a cross hair. Choosing the on the toolbar will toggle between 'Add' and 'Select-mode' and the cursor will be displayed as an arrow. Select the type of data object to be a Linked point choosing the on the toolbar. This icon will turn green if this type is selected. Alternatively one may select 'Edit' 'Add' 'Linked point' from the menu bar.

Position the mouse or digitiser to the location where you want to add a linked point and press the left- or right-hand mouse button or the enter button of the digitiser. Depending on the general settings, **DigEdit** will prompt for an ID, a value and a name. The ID to be entered should be the ID of a **line or a polygon**, so several linked points my have the same ID and different values. Thus, varying parameter values may be assigned to a line or a polygon.

***Note** that if you position the new linked point in the vicinity of an already existing point, vertex or linked point the new point may be slightly repositioned due to the process of snapping. Whether or not snapping will occur can be decided by adjusting the General settings (selecting 'Options' 'Setup' from the menu bar).*

8.6.10 How to select data objects

The program always starts in 'Add-mode'. The cursor within the graphical screen of **DigEdit** will be displayed as a cross hair. Choosing the on the toolbar will toggle between 'Add' and 'Select-mode' and the cursor will be displayed as an arrow. Now select the data object type you want to work with choosing the corresponding icon on the toolbar: , , or . The icon of the selected data object will turn green if this type is selected.

Data objects are selected positioning the mouse or digitiser in the vicinity of any data object of the chosen type (Point, Line, Polygon, or Linked Point) and pressing the left-hand mouse button or the enter button of the digitiser. Selecting a new data object will eventually deselect a previous selected data object. Selecting multiple data objects is possible via the 'Edit' 'Select' sub-commands from the menu bar or by using the **Ctrl-key together with the left-hand mouse button.**

Use of the **Ctrl-key** to add or remove data objects from a selection.

Pressing the **Ctrl-key** and the left-hand mouse button or the enter-button of the digitiser at the same time while pointing at a non-selected data object will add this data object to the selection. Pressing the **Ctrl-key** and the left-hand mouse button or the enter-button of the digitiser at the same time while pointing at an already selected data object will remove this data object from the selection.

It is possible to change the type of data object without loosing your actual selection by choosing the appropriate icon. Thus it is possible to select different types of data objects at the same time.

8.6.11 How to delete data objects

Deleting data objects is very easy. Select one or more data objects and press the **Del-key** or choose 'Edit' 'Delete' from the menu bar. Special attention has to be given to deleting vertices (see 'How to change a line' or 'How to change a polygon').

8.6.12 How to change a point object

There are two options to change a point:
- Move a point.
- Change the properties of a point.

Move a point

Select the and the on the toolbar. Position your mouse or digitiser to the point you want to move and press the left-hand mouse button or the enter button of the digitiser and keep it pressed, while dragging the point to its new position.

It is possible to select and move multiple points at the same time by first selecting these points (use the **Ctrl-key**, see 'How to select data objects') and then drag one of the selected points while keeping the **Ctrl-key** pressed. Beware to keep this point selected (the color of a selected data object is different from that of a non-selected item). All selected points will be moved over the same distance and in the same direction.

***Note** that if you drag a point to a new position in the vicinity of an already existing point, vertex or linked point the new position of the dragged point may be slightly changed by **DigEdit** due to the process of snapping.*

Change a point's properties

Select the and the on the toolbar. Position your mouse or digitiser to the point of which you want to change the properties and press the **right-hand mouse button** or the second button of the digitiser. **DigEdit** will display the pop-up dialog box and prompts for an ID, a value and a name.

Another way of changing the properties of one point is to first select the point (use the left-hand mouse button in stead of the right-hand mouse button). After having selected the point, one can choose 'Edit' 'Modify' from the menu bar and one of the sub-commands or press the right-hand mouse button.

It is possible to select multiple points (or a point and other data objects) and to change their properties at the same time. First select the data objects (use the **Ctrl-key**, see 'How to select data objects') and then choose 'Edit' 'Modify' from the menu bar and one of the sub-commands. In this case **do not use** the right-hand mouse button.

8.6.13 How to change a line object

The following options are available to change a line:
- Move a line.
- Move a vertex of the line.
- Add a vertex to the line.
- Delete a vertex from the line.
- Change the line's properties.

Move a line

Select the and the on the toolbar. Position your mouse or digitiser to the line you want to move and

press the left-hand mouse button or the enter button of the digitiser and keep it pressed, while dragging the line to its new position.

It is possible to select and move multiple lines at the same time by first selecting these lines (use the **Ctrl-key**, see 'How to select data objects') and then drag one of the selected lines while keeping the **Ctrl-key** pressed. Beware to keep this line selected (the color of a selected data object is different from that of a non-selected item). All selected lines will be moved over the same distance and in the same direction.

***Note** that if you drag a line to a new position and one or more of its vertices will be in the vicinity of an existing point, vertex or linked point the new position of the dragged line may be slightly changed by **DigEdit** due to the process of snapping.*

Move a vertex of the line

Moving one or more vertices of a line is very much the same as moving a point. Select the and the on the toolbar. Position your mouse or digitiser to the vertex you want to move and press the left-hand mouse button or the enter button of the digitiser and keep it pressed, while dragging the vertex to its new position.

Beware not to select a **line** instead of a **vertex**, otherwise the entire line will be moved. In case this happens press **Ctrl-Z** to undo.

Add a vertex to the line

In order to add a vertex to a line the line itself should be selected first (see 'How to select data objects'). If you select multiple lines, the vertex will only be added to the last line selected.

After having selected the line to which the new vertex has to be added select 'Edit' 'Add' 'Vertex' from the menu bar or press the **Ins-key**. A specific cursor will appear on the screen. Move your mouse or digitiser to the desired position of the new vertex and click the left-hand mouse button or the enter button of the digitiser.

If the position of the new vertex is past the beginning or end of the line, **DigEdit** automatically connects the new vertex to the first or last existing vertex. If the position of the new vertex is somewhere along the line the new vertex will be inserted between the nearest two existing vertices.

Delete a vertex from the line

Deleting a vertex of a line is quite similar to deleting a point.

Select the and the on the toolbar. Position your mouse or digitiser to the vertex you want to delete and press the left-hand mouse button or the enter button of the digitiser. Next, select 'Edit' 'Delete' from the menu bar or press the **Del-key**. **DigEdit** automatically restores the connections between new successive vertices. It is possible to select multiple vertices and to delete them all at the same time using the **Ctrl-key** (see 'How to select data objects').

***Note** that if you delete a vertex of a line that consists of two vertices only, the whole line will be deleted!*

Change the line's properties

Changing the properties of a line is quite similar to changing the properties of a point.

Select the and the on the toolbar. Position your mouse or digitiser to the line of which you want to change the properties and press the **right-hand mouse button** or the second button of the digitiser. **DigEdit** will display the pop-up dialog box and prompts for an ID, a value and a name.

Another way of changing the properties of one line is to first select the line (use the left-hand mouse button in stead of the right-hand mouse button). After having selected the line, one can choose 'Edit' 'Modify' from the menu bar and one of the sub-commands or press the right-hand mouse button.

It is possible to select multiple lines (or a line and other data objects) and to change their properties at the same time. First select the data objects (use the **Ctrl-key**, see 'How to select data objects') and then choose 'Edit' 'Modify' from the menu bar and one of the sub-commands. In this case **do not use** the right-hand mouse button.

8.6.14 How to change a polygon object

The possible options to change a polygon are similar to those for changing a line:
- Move a polygon.
- Move a vertex of the polygon.
- Add a vertex to the polygon.
- Delete a vertex from the polygon.
- Change the polygon's properties.

Move a polygon

Select the and the on the toolbar. Position your mouse or digitiser to the polygon you want to move and press the left-hand mouse button or the enter button of the digitiser and keep it pressed, while dragging the polygon to its new position.

It is possible to select and move multiple polygons at the same time by first selecting these polygons (use the **Ctrl-key**, see 'How to select data objects') and then drag one of the selected polygons while keeping the **Ctrl-key** pressed. Beware to keep this polygon selected (the color of a selected data object is different from that of a non-selected item). All selected polygons will be moved over the same distance and in the same direction.

***Note** that if you drag a polygon to a new position and one or more of its vertices will be in the vicinity of an existing point, vertex or linked point the new position of the dragged polygon may be slightly changed by **DigEdit** due to the process of snapping.*

Move a vertex of the polygon

Moving one or more vertices of a polygon is very much the same as moving a point. Select the and the on the toolbar. Position your mouse or digitiser to the vertex you want to move and press the left-hand mouse button or the enter button of the digitiser and keep it pressed, while dragging the vertex to its new position.

Beware not to select a **polygon** instead of a **vertex**, otherwise the entire polygon will be moved.

Add a vertex to the polygon

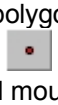
Adding a vertex to a polygon is quite similar to adding a vertex to a line; the polygon to which the vertex will be added should be selected first (see 'How to select data objects'). If you select multiple polygons, the vertex will only be added to the last polygon selected.

After having selected the polygon to which the new vertex has to be added, select 'Edit' 'Add' 'Vertex' from the menu bar or press the **Ins-key**. A specific cursor will appear on the screen. Move your mouse or digitiser to the desired position of the new vertex and click the left-hand mouse button or the enter button of the digitiser.

DigEdit automatically connects the new vertex to the nearest two existing vertices of the polygon.

Delete a vertex from the polygon

Deleting a vertex of a polygon is quite similar to deleting a point.

Select the and the  on the toolbar. Position your mouse or digitiser to the vertex you want to delete and press the left-hand mouse button or the enter button of the digitiser. Next, select 'Edit' 'Delete' from the menu bar or press the **Del-key**. **DigEdit** automatically restores the connections between new successive vertices. It is possible to select multiple vertices and to delete them at the same time using the **Ctrl-key** (see 'How to select data objects').

***Note** that if you delete the first vertex the last vertex will be deleted also. Thus, a polygon will always remain closed*

Change the polygon's properties

Changing the properties of a polygon is quite similar to changing the properties of a point.

Select the and the on the toolbar. Position your mouse or digitiser to the polygon of which you want

to change the properties and press the **right-hand mouse button** or the second button of the digitiser. **DigEdit** will display the pop-up dialog box and prompts for an ID, a value and a name.

Another way of changing the properties of one polygon is to first select the polygon (use the left-hand mouse button in stead of the right-hand mouse button). After having selected the polygon, one can choose 'Edit' 'Modify' from the menu bar and one of the sub-commands or press the right-hand mouse button.

It is possible to select multiple polygons (or a polygon and other data objects) and to change their properties at the same time. First select the data objects (use the **Ctrl-key**, see 'How to select data objects') and then choose 'Edit' 'Modify' from the menu bar and one of the sub-commands. In this case **do not use** the right-hand mouse button.

8.6.15 How to change a linked point object

Similar to a point there are two options available to change a linked point:
- Move a linked point.
- Change the properties of a linked point.

Move a linked point

Moving a linked point is quite similar to moving a point.

Select the and the on the toolbar. Position your mouse or digitiser to the linked point you want to move and press the left-hand mouse button or the enter button of the digitiser and keep it pressed, while dragging the linked point to its new position.

It is possible to select and move multiple linked points at the same time by first selecting these points (use the **Ctrl-key**, see 'How to select data objects') and then drag one of the selected points while keeping the **Ctrl-key** pressed. Beware to keep this point selected (the color of a selected data object is different from that of a non-selected item). All selected linked points will be moved over the same distance and in the same direction.

***Note** that if you drag a linked point to a new position in the vicinity of an already existing point, vertex or linked point the new position of the dragged linked point may be slightly changed by **DigEdit** due to the process of snapping.*

Change the properties of a linked point

Changing the properties of a linked point is quite similar to changing the properties of a point.

Select the and the on the toolbar. Position your mouse or digitiser to the linked point of which you want to change the properties and press the **right-hand mouse button** or the second button of the digitiser. **DigEdit** will display the pop-up dialog box and prompts for an ID, a value and a name. Remember that the ID of a linked point is the same as the ID of the data object it is linked to.

Another way of changing the properties of one linked point is to first select the linked point (use the left-hand mouse button in stead of the right-hand mouse button). After having selected the linked point, one can choose 'Edit' 'Modify' from the menu bar and one of the sub-commands or press the right-hand mouse button.

It is possible to select multiple linked points (or a linked point and other data objects) and to change their properties at the same time. First select the data objects (use the **Ctrl-key**, see 'How to select data objects') and then choose 'Edit' 'Modify' from the menu bar and one of the sub-commands. In this case **do not use** the right-hand mouse button.

Keep in mind that a linked point has no own ID but that its ID is the same as the ID of the line or polygon it is linked to. Changing the IDs of the selected data objects at the same time may result in linked points pointing to non-existing lines or polygons.

8.7 Using digitising equipment

DigEdit allows the use of digitising equipment that should be connected to the user's PC. Alternatively the user may use digitizing equipment on a separate system and store the information in ARC/INFO's ungenerated format for later use with **Triwaco** and **DigEdit** (see 'Using ARC/INFO').

To define the digitising equipment used and the communication settings choose 'Options' 'digitiser' from the menu bar. A pop-up dialog box will appear. The user can choose from a restricted number of digitisers. The specifications of these digitisers are stored in the [diglist] section of the '**DigEdit**.ini' file, located in the Windows-directory.

Next the user has to specify the communication port the digitising equipment is connected to, the baud rate and some other communication parameters.

Detailed information on how to use specific digitizing equipment together with **DigEdit** may be obtained from the Triwaco Helpdesk Operators.